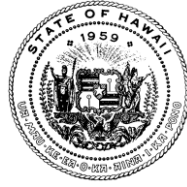


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In reply, please refer to:
EMD/CWB

09017PKP.19c

DATE: October 23, 2019

NPDES PERMIT NO. HI 0110078

**FACT SHEET: APPLICATION FOR RENEWAL OF NATIONAL POLLUTANT
DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND ZONE
OF MIXING (ZOM) TO DISCHARGE TO THE PACIFIC OCEAN,
WATERS OF THE UNITED STATES**

PERMITTEE: UNITED STATES MARINE CORPS, MARINE CORPS BASE HAWAII

**FACILITY: MARINE CORPS BASE HAWAII, KANEOHE BAY WATER
RECLAMATION FACILITY**

FACILITY MAILING ADDRESS

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This fact sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of the draft permit.

A. Permit Information

The following table summarizes administrative information related to the Marine Corps Base Hawaii, Kaneohe Bay Water Reclamation Facility (facility).

Table F-1. Facility Information

Permittee	United States Marine Corps, Marine Corps Base Hawaii
Name of Facility	Marine Corps Base Hawaii, Kaneohe Bay Water Reclamation Facility
Facility Address	Building 0829 Kaneohe Bay, Hawaii 96863
Facility Contact, Title, and Phone	Edward Zuelke, Compliance Chief (808) 257-7142
Authorized Person to Sign and Submit Reports	Lt. Col. T.B. Pochop, Director (808) 257-5640
Mailing Address	Box 63002 MCBH Kaneohe Bay, Hawaii 96863-3002
Billing Address	Same as above
Type of Facility	Wastewater Treatment Plant
Pretreatment Program	Yes
Reclamation Requirements	No
Facility Design Flow	2.0 million gallons per day (MGD)
Receiving Waters	Outfall Serial No. 001: Pacific Ocean (treated wastewater) Outfall Serial No. 002: Kaneohe Bay (storm water)
Receiving Water Type	Pacific Ocean: Marine (treated wastewater) Kaneohe Bay: Embayment (storm water)
Receiving Water Classification	Outfall Serial No. 001: Class A Dry Open Coastal Waters (HAR, 11-54-06(b)(2)(B)) (treated wastewater) Outfall Serial No. 002: Class AA, Embayment (HAR, 11-54-06(a)(2)(A)(i)) (storm water)

1. NPDES Permit No. HI 0110078, including the Zone of Mixing (ZOM), became effective on May 16, 2014, and expired on April 15, 2019. On September 17, 2014, the United States Marine Corps, Marine Corps Base Hawaii (Permittee) filed a Notice of Appeal for certain conditions of the permit and requesting that those conditions be stayed until an administrative hearing could be held.
2. The Permittee reapplied for an NPDES permit and ZOM on October 15, 2018, and the Hawaii Department of Health (DOH) administratively extended the NPDES permit, including the Zone of Mixing (ZOM), on April 2, 2019, pending the reapplication process.
3. The DOH proposes to issue a permit to discharge to the waters of the state until **five years after the effective date of the permit**, and has included in the draft permit those terms and conditions which are necessary to carry out the provisions

of the Federal Water Pollution Control Act (P.L. 92-500), Federal Clean Water Act (CWA) (P.L. 95-217) and Chapter 342D, Hawaii Revised Statutes.

B. Facility Setting

1. Facility Operation and Location

The Permittee owns and operates the facility, located at the Marine Corps Base Hawaii Kaneohe Bay, on the island of Oahu. The facility has a design dry weather flow capacity of 2.0 MGD and provides secondary level treatment of wastewater for a population of approximately 16,000 from mainly domestic sources and a small portion of minor industrial discharges. Treatment consists of screening and grinding, a grit chamber, a primary clarifier, a trickling filter, a secondary clarifier, and an effluent polishing basin.

Treated effluent is discharged to the Pacific Ocean off of the Mokapu Peninsula, through the City and County of Honolulu's (CCH's) Outfall Serial No. 001 (Mokapu Outfall), at latitude 21° 27' 32" N and longitude 157° 42' 56" W. The Mokapu Outfall is a joint outfall which is also used by the Kailua Regional Wastewater Treatment Plant (KRWWTTP). The facility is also capable of routing reclaimed wastewater to the Klipper Golf Course for irrigation. Currently the facility is not discharging any reclaimed water to the Klipper Golf Course for irrigation and it is not known if it will resume.

Outfall Serial No. 001 is a 48-inch diameter, deep ocean outfall that discharges treated effluent through a diffuser that starts approximately 4,072 feet from a cleanout chamber at shore and 105 feet below the surface of the water. The diffuser is approximately 984 feet long with 81 side ports that range in size from 4 inches to 5.5 inches in diameter and two (2) end ports, one (1) with a 4-inch diameter and one with a 5.5-inch diameter.

Sludge processing consists of anaerobic digestion in a primary digester, a holding tank, and dewatering in four drying beds. Solids are disposed of at landfill on the Marine Corps Base Hawaii.

Storm water from the facility naturally flows to the southwest corner of the facility where it is discharged to a wildlife sanctuary and subsequently discharged to the Pacific Ocean at Kaneohe Bay from Outfall Serial No. 002 at latitude 21°26'17" N and longitude 157°45'34" W.

Figure 1 of the draft permit provides a map showing the location of the facility. Figure 2 of the draft permit provides a map of the ZOM, Zone of Initial Dilution (ZID), and receiving water monitoring station locations.

2. Receiving Water Classification

The Pacific Ocean off of Mokapu Peninsula, is designated as “Class A Dry Open Coastal Waters” under Hawaii Administrative Rules (HAR), 11-54-06(b)(2)(B). Protected beneficial uses of Class A waters include recreation, aesthetic enjoyment, and the protection and propagation of fish, shellfish, and wildlife.

Kaneohe Bay is designated as “Class AA Embayment” under HAR, 11-54-06(a)(2)(A)(i). Protected beneficial uses are for the protection of marine life. It is the objective of Class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions.

3. Ocean Discharge Criteria

The DOH has considered the Ocean Discharge Criteria, established pursuant to Section 403(c) of the CWA for the discharge of pollutants into the territorial sea, the waters of the contiguous zone, or the oceans. The United States Environmental Protection Agency (EPA) has promulgated regulations for Ocean Discharge Criteria in 40 Code of Federal Regulations (CFR) Part 125, Subpart M. The DOH has determined that the discharge will not cause unreasonable degradation to the marine environment. Based on current information, the DOH proposes to issue a permit.

4. Impaired Water Bodies on CWA 303(d) List

CWA Section 303(d) requires states to identify specific water bodies where water quality standards (WQS) are not expected to be met after implementation of technology-based effluent limitations on point sources.

On August 16, 2018 EPA approved the 2018 State of Hawaii Water Quality Monitoring and Assessment Report, which includes the 2018 303(d) List of Impaired Water Bodies in the State of Hawaii.

The Pacific Ocean off of Mokapu Peninsula is not specifically listed in the 2018 303(d) list. However, Fort Hase Beach, which is the closest listing to Outfall Serial No. 001, is included in the report but not listed as impaired. It is classified as a Category 2 and 3 waterbody. At present, no TMDLs have been established for this waterbody.

5. Summary of Existing Effluent Limitations

a. Existing Effluent Limitations and Monitoring Data – Outfall Serial No. 001

Effluent limitations contained in the existing permit for discharges from Outfall Serial No. 001 and the highest reported monitoring data from January 2014 through December 2018 is presented in the following table.

Table F-2. Historic Effluent Limitations and Monitoring Data – Outfall Serial No. 001

Parameter	Units	Effluent Limitation			Reported Data Maximum		
		Average Monthly	Average Weekly	Maximum Daily	Average Monthly	Average Weekly	Maximum Daily
Flow	MGD	1	1	1	2.28	3.05	2.5
Biochemical Oxygen Demand (5-Day)	mg/L	30	45	1	23.2	40.5	1300
	lbs/day	500	751	1	229	430	556
	% Removal	As a monthly average, not less than 85 percent removal efficiency from influent stream.			81 ²		
Total Suspended Solids	mg/L	30	45	1	9.1	16.5	17
	lbs/day	500	751	1	95	172	206
	% Removal	As a monthly average, not less than 85 percent removal efficiency from influent stream.			85 ²		
pH	standard units	Not less than 6.0 nor greater than 9.0			6.72 – 8.68		
Enterococcus	CFU/100 mL	6,510 ³	---	93,186 ³	157,254	--	410,000
Oil and Grease	mg/L	--	--	10	--	--	17.9
Chlordane	µg/L	--	--	0.74 ³	--	--	0.1
	lbs/day	--	--	0.012 ³	--	--	0.002
Total Nitrogen	µg/L	1,4	--	1	15,121 ⁴	--	23,300
	lbs/day	1,4	--		181 ⁴	--	323
Ammonia Nitrogen	µg/L	--	--	26,810 ³	--	--	18,400
	lbs/day	--	--	447 ³	--	--	195
Nitrate+Nitrite Nitrogen	µg/L	--	--	6,400 ³	--	--	6970
	lbs/day	--	--	107 ³	--	--	113
Total Phosphorus	µg/L	1,4	--	1	3,341 ⁴	--	27,100
	lbs/day	1,4	--	1	33 ⁴	--	294
Turbidity	NTU	--	--	1		--	13
Chronic Toxicity – <i>Tripneustes Gratilla</i>	Pass	--	--	Pass	--	--	Fail ⁵

¹ No effluent limitations for this pollutant in the 2014 permit, only monitoring required.

² Represents the minimum reported percent removal.

³ Effluent limitation was stayed during the term of the 2014 permit.

⁴ Annual geometric mean.

⁵ There were three chronic WET test failures from June 2014 to December 2018.

b. Existing Storm Water Limitations and Monitoring Data – Outfall Serial No. 002

Storm water limitations contained in the existing permit for discharges from Outfall Serial No. 002 and storm water monitoring results reported for 2018, the only year reporting monitoring results, are presented in the following table.

**Table F-3. Historic Storm Water Limitations and Monitoring Data –
Outfall Serial No. 002**

Parameter	Units	Effluent Limitation	Reported Data Maximum
Flow	GPD	1	2
Biochemical Oxygen Demand (5-Day)	mg/L	1	1
Chemical Oxygen Demand	mg/L	1	17
Total Suspended Solids	mg/L	100	0.1
Total Phosphorus	mg/L	1	0.63
Total Nitrogen	mg/L	1	1.8
Nitrate Plus Nitrite Nitrogen	mg/L	1	0.12
Oil and Grease	mg/L	15	2
pH	standard units	7.0 – 8.6	8.38
Arsenic, Total	µg/L	1	5
Cadmium, Total	µg/L	1	1
Chromium, Total	µg/L	1	31
Copper, Total	µg/L	1	34
Lead, Total	µg/L	1	30
Mercury, Total	µg/L	1	0.35
Nickel, Total	µg/L	1	67
Selenium, Total	µg/L	1	1.3
Silver, Total	µg/L	1	4.4
Zinc, Total	µg/L	1	310

¹ No effluent limitations for this pollutant in the 2014 permit, only monitoring required.

² Not reported.

6. Compliance Summary

- a. Effluent Limitation Exceedances.** The following table lists effluent limitation exceedances for Outfall Serial No. 001 as identified in the Permittee's renewal application.

Table F-4. Summary of Compliance History

Monitoring Period	Exceedance Type	Pollutant	Reported Value	Permit Limitation	Units
July 2014	Daily Maximum	Toxicity	Fail	Pass	--
December 2015	Daily Maximum	Toxicity	Fail	Pass	--
April 2016	Daily Maximum	Toxicity	Fail	Pass	--
December 2016	Weekly Average	BOD	150	45	mg/L
December 2016	Monthly Average	BOD	119.4	30	mg/L
October 2017	Daily Maximum	Nitrate+Nitrite Nitrogen	6680	6400	µg/L
April 2018	Daily Maximum	Oil and Grease	17.9	10	mg/L

b. Inspections. The DOH, with PG Environmental, LLC, conducted Compliance Evaluation Inspections (CEIs) of the facility on April 7, 2015, April 20, 2017, and March 29, 2019. The inspection findings are listed below:

(1) April 7, 2015 Inspection

The primary purpose of the inspection was to determine the accuracy and reliability of the Permittee's operation and maintenance and process control programs for NPDES compliance. The main findings are summarized below.

- The facility did not have formal, written Standard Operating Procedures (SOPs).
- The facility's work order system, Maximo, did not appear to function as described by staff.
- Two trickling filter distribution arms were not in operation due to the trickling filter turntable being in disrepair. In addition, the status of the work order for the repair was unclear.
- Petroleum sheen on the surface of the wastewater within the facility's secondary clarifier. The source of the sheen was unknown.
- Damaged baffle ring in the final clarifier which could lead to a short circuit.
- The facility uses the old chlorine contact channel as additional aeration which appears to improve the quality of the wastewater.
- A temporary floating vacuum pump is soft piped from the polishing/aeration basin directly to the facility's effluent pump station because the outlet structure is undersized for high flows and wet weather events. This bypasses the effluent composite sampler which compromises the collection of a representative sample. In addition, work orders generated in 2012 and 2013 to hard-pipe the pump and install a flow meter at the polishing/aeration basin have not yet been completed.
- Digester #2 was not operational because its level controller was being replaced, however, no work order for this replacement was found. Other work orders involving Digester #2 were located.
- There appeared to be a disconnect between the MCBH Facilities Department and the facility's operations staff regarding the documentation of preventative maintenance and corrective maintenance activities.

(2) April 20, 2017 Inspection

The main purpose of the inspection was to determine the accuracy and reliability of the Permittee's self-monitoring and reporting program.

- One of two recycled water irrigation pumps located at the WRF irrigation pump station was not operational.
- There was one whole effluent toxicity failure between January 2016 and February 2017. The Permittee immediately reported the April 2016 failure and requested a waiver of the five-day written report. The facility commenced the accelerated testing protocol where the first test passed. The Permittee determined that the failure was due to the large amount of re-use water used to remove excessive duck weed from the effluent screen and resumed normal monthly monitoring.
- Instead of submitting a ZOM Dilution Analysis Study as required by the current permit, the Permittee submitted a letter stating that the study was submitted by the CCH. Effluent from the facility discharges through the CCH's deep ocean outfall and as a result, there is an understanding that the CCH conducts the study for both their KRWWTTP and the facility.

(3) March 29, 2019 Inspection

- The facility's effluent has consistently met the effluent discharge limitations specified in the NPDES permit with the exception of an oil and grease daily maximum effluent limitation exceedance that occurred in early 2018.
- The first two milestones of the compliance schedule associated with the interim effluent limitations for chlordane specified in the NPDES permit were not completed. However, the interim effluent limitations for chlordane were stayed per Docket No. 15-CWB-EMD, dated June 3, 2015.
- Oil and grease samples were not collected in accordance with 40 CFR Part 136.
- Minor structural deficiencies were noted on the trickling filter and final clarifier.
- An onsite storm drain inlet was observed that is not identified in the facility's Storm Water Pollution Control Plan. The drain line was previously blocked but currently appears to be draining.
- The facility is undergoing a 25-year rehabilitation project.

c. Enforcement Actions. There are currently no enforcement actions associated with the facility.

7. Planned Changes

The facility is in Phase 3 of their 25-year rehabilitation project. Phases 1 and 2 included rehabilitating the influent wet well and influent pump station floor; replacement of the influent pump station level controllers; installation of a new influent bar screen with compactor, new stainless steel center drive units on the primary clarifier and trickling filter, new ISCO samplers, a new effluent flow meter,

a new nutrient odor control system, new peristaltic sludge transfer pumps, a new waste gas burner system and a new emergency generator; and the construction of a new operations building.

Phase 3 improvements includes a complete electrical system upgrade; installation of a supervisory control and data acquisition (SCADA) system, a new stainless steel center drive unit on the final clarifier and new valves; rebuilding Digester No. 1; and converting the existing digested sludge holding tank into an aerobic digester.

C. Applicable Plans, Policies, and Regulations

1. Hawaii Administrative Rules, Chapter 11-54

On November 12, 1982, the Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54 became effective (hereinafter HAR, Chapter 11-54). HAR, Chapter 11-54 was amended and compiled on October 6, 1984; April 14, 1988; January 18, 1990; October 29, 1992; April 17, 2000; October 2, 2004; June 15, 2009; October 21, 2012; December 6, 2013; and the most recent amendment was on November 15, 2014. HAR, Chapter 11-54 establishes beneficial uses and classifications of state waters, the state antidegradation policy, zones of mixing standards, and water quality criteria that are applicable to the Pacific Ocean off of Mokapu Peninsula and Kaneohe Bay.

Requirements of the draft permit implement HAR, Chapter 11-54.

2. Hawaii Administrative Rules, Chapter 11-55

On November 27, 1981 HAR, Title 11, Department of Health, Chapter 55 became effective (hereinafter HAR, Chapter 11-55). HAR Chapter 11-55 was amended and compiled on October 29, 1992; September 22, 1997; January 6, 2001; November 7, 2002; August 1, 2005; October 22, 2007; June 15, 2009; October 21, 2012; December 6, 2013; November 15, 2014; July 13, 2018; and the most recent amendment was on February 9, 2019. HAR, Chapter 11-55, establishes standard permit conditions and requirements for NPDES permits issued in Hawaii.

Requirements of the draft permit implement HAR, Chapter 11-55.

3. State Toxics Control Program

NPDES Regulations at 40 CFR 122.44(d) require permits to include water quality-based effluent limitations (WQBELs) for pollutants, including toxicity, that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an exceedance of a water quality standard. The *State Toxics Control Program: Derivation of Water Quality-Based Discharge Toxicity Limits for Biomonitoring and Specific Pollutants* (hereinafter, STCP) was finalized in April 1989, and provides guidance for the development of water quality-based toxicity

control in NPDES permits by developing the procedures for translating water quality standards in HAR, Chapter 11-54 into enforceable NPDES permit limitations. The STCP identifies procedures for calculating permit limitations for specific toxic pollutants for the protection of aquatic life and human health.

Guidance contained in the STCP was used to determine effluent limitations in the draft permit.

4. Hawaii Implementation Plan for Toxic Pollutants and Nutrients

The Hawaii Implementation Plan for Toxics Pollutants and Nutrients in National Pollutant Discharge Elimination System Permit Process (HIP) is a draft DOH document that establishes procedures for DOH staff in the implementation of the water quality standards and procedures found in HAR 11-54 and 11-55 related to the NPDES permit process.

5. Technical Support Document for Water Quality-Based Toxics Control

Technical Support Document for Water Quality-Based Toxics Control (TSD) provides technical guidance for assessing and regulating the discharge of toxic substances to receiving waters. It was issued in support of EPA regulations and policy initiatives involving the application of biological and chemical assessment techniques to control toxic pollution to surface waters.

6. 40 CFR 133 Secondary Treatment Regulations

Pursuant to CWA 301(b)(1)(B), secondary treatment regulations were established in 40 CFR 133. These technology-based regulations apply to all publicly owned treatment works and identify the minimum level of effluent quality attainable by secondary treatment in terms of 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH.

D. Rationale for Effluent Limitations and Discharge Specifications

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. NPDES regulations establish two principal bases for effluent limitations. At 40 CFR 122.44(a), permits are required to include applicable technology-based limitations and standards; and at 40 CFR 122.44(d), permits are required to include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. When numeric water quality objectives have not been established, but a discharge has the reasonable potential to cause or contribute to an excursion above a narrative criterion, WQBELs may be established using one or more of three methods described at 40 CFR 122.44(d)(1)(vi) WQBELs may be established using a calculated water quality criterion derived from a proposed state criterion or an explicit

state policy or regulation interpreting its narrative criterion; 2) WQBELs may be established on a case-by-case basis using EPA criteria guidance published under CWA Section 304(a); or 3) WQBELs may be established using an indicator parameter for the pollutant of concern.

1. Technology-Based Effluent Limitations

a. Scope and Authority

Section 301(b) of the CWA and implementing EPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards.

The discharge authorized by this permit must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR 133.

Regulations promulgated in 40 CFR 125.3(a)(1) require technology-based effluent limitations for municipal dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for publically owned treatment works (POTWs) [defined in section 304(d)(1)]. CWA Section 301(b)(1)(B) requires that such treatment works must, at a minimum, meet effluent limitations based on secondary treatment as defined by the EPA Administrator.

Based on this statutory requirement, EPA developed secondary treatment regulations, which are specified in 40 CFR 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), and pH.

b. Applicable Technology-Based Effluent Limitations

At 40 CFR 133 in the Secondary Treatment Regulations, EPA has established the minimum required level of effluent quality attainable by secondary treatment shown in Table F-4 below. The standards in Table F-4 are applicable to the facility and therefore established in the draft permit as technology-based effluent limitations.

Table F-5. Applicable Technology-Based Effluent Limitations

Parameter	Units	30-Day Average	7-Day Average
BOD ₅ ¹	mg/L	30	45

Parameter	Units	30-Day Average	7-Day Average
TSS ¹	mg/L	30	45
pH	standard units	6.0 – 9.0	

¹ The 30-day average percent removal shall not be less than 85 percent.

2. Water Quality-Based Effluent Limitations (WQBELs)

a. Scope and Authority

NPDES Regulations at 40 CFR 122.44(d) require permits to include WQBELs for pollutants, including toxicity, that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard (reasonable potential). As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for all pollutants “which the Director determines are or may be discharged at a level that will cause, have reasonable potential to cause, or contribute to an excursion above any state water quality standard.”

The process for determining reasonable potential and calculating WQBELs, when necessary, is intended to protect the receiving waters as specified in HAR, Chapter 11-54. When WQBELs are necessary to protect the receiving waters, the DOH has followed the requirements of HAR, Chapter 11-54, the STCP, and other applicable State and federal guidance policies to determine WQBELs in the draft permit.

Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established in accordance with the requirements of 40 CFR 122.44(d)(1)(vi), using (1) EPA criteria guidance under CWA Section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state’s narrative criterion, supplemented with other relevant information.

b. Applicable Water Quality Standards

The beneficial uses and water quality standards that apply to the receiving waters for this discharge are from HAR, Chapter 11-54.

(1) Basic Water Quality Criteria Applicable to All Waters.

HAR, 11-54-4(c)(3) specifies numeric aquatic life standards for 72 toxic pollutants and human health standards for 61 toxic pollutants, as well as narrative standards for toxicity. Effluent limitations and provisions in the

draft permit are based on available information to implement these standards.

- (a) **Saltwater Standards.** The facility discharges to the Pacific Ocean, which has a dissolved inorganic ion concentration well above 0.5 parts per thousand (ppt). As specified in HAR, Chapter 11-54, saltwater standards apply when the dissolved inorganic ion concentration is above 0.5 ppt. As such, a reasonable potential analysis (RPA) was conducted using saltwater standards.
 - (b) **Human Health Standards.** Additionally, human health WQS were also used in the RPA to protect human health. Where both saltwater standards and human health standards are available for a particular pollutant, the more stringent of the two will be used in the RPA.
 - (c) **Total Recoverable Metals.** 40 CFR 122.45(c) requires effluent limitations for metals to be expressed as the total recoverable form. Since WQS for metals are expressed in the dissolved form in HAR, Chapter 11-54, factors or translators can be used to convert metal concentrations from dissolved to total recoverable. As such, the EPA default conversion factors in the EPA guidance manual, *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996) were used to convert the saltwater acute WQS to total recoverable values.
 - (d) **Receiving Water Hardness.** HAR, Chapter 11-54 contains water quality criteria for six metals that vary as a function of hardness in freshwater. A lower hardness results in a lower freshwater WQS. The metals with hardness dependent standards include cadmium, copper, lead, nickel, silver, and zinc. Ambient hardness values are used to calculate freshwater WQS that are hardness dependent. Since saltwater standards are used for the RPA, the receiving water hardness was not taken into consideration when determining reasonable potential.
- (2) **Specific Water Quality Criteria for the Pacific Ocean.**
HAR, 11-54-6(b)(3) specifies water quality criteria for nutrients, turbidity, pH, dissolved oxygen, temperature and salinity for the Pacific Ocean. Criteria for nutrients are classified as "not to exceed the given value more than two per cent of the time," "not to exceed the given value more than ten per cent of the time" and "geometric mean not to exceed the given value." Other parameters include acceptable ranges based on the ambient values.

c. Determining the Need for WQBELs

NPDES regulations at 40 CFR 122.44(d) require effluent limitations to control all pollutants which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard. Assessing whether a pollutant has reasonable potential is the fundamental step in determining whether or not a WQBEL is required. Using the methods prescribed in EPA's *Technical Support Document for Water Quality-Based Toxics Control* (the TSD, EPA/505/2-90-001, 1991), the effluent data from Outfall Serial No. 001 were analyzed to determine if the discharge demonstrates reasonable potential. The RPA compared the effluent data with numeric and narrative water quality standards in HAR, Chapter 11-54-4. To determine reasonable potential for nutrients contained in HAR, Chapter 11-54-6, a direct comparison of the receiving water concentrations at the edge of the ZOM was compared to the most stringent WQS.

(1) Reasonable Potential Analysis (RPA)

Toxic Pollutants. Using the methods described in EPA's *Technical Support Document for Water Quality-Based Toxics Control* (the TSD, EPA/505/2-90-001, 1991), the effluent data for toxic pollutants from Outfall Serial No. 001 were analyzed to determine if the discharge demonstrates reasonable potential to exceed the applicable WQS. The RPA for pollutants with WQS specified in HAR, 11-54-4, based on the TSD, combines knowledge of effluent variability as estimated by a coefficient of variation with the uncertainty due to a limited number of data to project an estimated maximum receiving water concentration as a result of the effluent. The estimated receiving water concentration is calculated as the upper bound of the expected lognormal distribution of effluent concentrations at a high confidence level. The projected maximum receiving water concentration, after consideration of dilution, is then compared to the most stringent applicable WQS in HAR, Chapter 11-54, to determine if the pollutant has reasonable potential. The projected maximum receiving water concentration has reasonable potential if it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentrations is below the receiving water standards.

The projected maximum receiving water concentration for non-carcinogens is calculated using the following equation:

$$\text{Maximum ARWC} = (\text{Multiplier} * X_{\text{Max}}) / (1 + D)$$

Where:

Maximum ARWC	=	Annual receiving water concentration
Multiplier	=	Multiplier calculated using methods in Section 3.3.2 of the TSD (99% multiplier for municipal facilities and 95% multiplier for industrial facilities)

X_{Max}	=	Highest observed pollutant concentration ($\mu\text{g/L}$)
D	=	Parts receiving water to effluent

The initial dilution at the ZID is used as D for determining reasonable potential for non-carcinogens.

The projected maximum receiving water concentration for carcinogens is calculated using the following equation:

$$\text{Maximum ARWC} = X_{Max} / (1 + D)$$

Where:

Maximum ARWC	=	Receiving water concentration
X_{Max}	=	Highest observed annual average pollutant concentration ($\mu\text{g/L}$)
D	=	Parts receiving water to effluent

The average dilution at the ZOM is used as D for determining reasonable potential for carcinogens.

Due to the long exposure time associated with human health criteria for carcinogens (e.g., 70 years), the RPA for carcinogens was performed based on an observed maximum annual average value compared to the applicable criteria. The use of the maximum annual average assumes an exposure period that is much shorter than the period of exposure for the criteria and is reasonable to assume will be greater than the long-term average over the period of exposure for the criteria. As such, the use of an annual average in evaluating reasonable potential for the most stringent criteria for carcinogens is protective of water quality.

The RPA followed the guidance set forth by the EPA through its Region 10 in EPA Region 10 Guidance for WQBELs Below Analytical Detection/Quantitation Level, EPA, 1996 in its treatment of data that is detected at limits below the Minimum Level (i.e., the level at which the parameter may be accurately quantified) or the Detection Limit. Where the maximum annual average concentration is greater than the applicable WQS from HAR, Chapter 11-54, then reasonable potential exists for the pollutant, and effluent limitations are established.

Nutrients. The most stringent WQS for nutrients specified in HAR, 11-54-6, are provided as geometric means and exceedances of these WQS are less sensitive to effluent variability. The RPA was conducted by directly comparing the maximum annual geometric mean of receiving water data at the edge of the ZOM to the applicable geometric mean listed in HAR, 11-54-6. The average dilution at the ZOM was taken into account for all nutrients.

(2) Effluent and Receiving Water Data. The RPA was based on effluent monitoring data submitted to DOH in DMRs from January 2014 through December 2018. Because the Mokapu Outfall is a joint outfall, receiving water data was collected by the KRWWTTP and submitted to the DOH in DMRs from January 2014 through December 2019.

(3) Dilution. The STCP discusses dilution, defined as the reduction in the concentration of a pollutant or discharge which results from mixing with the receiving waters, for submerged and high-rate outfalls. The STCP states that minimum dilution is used for establishing effluent limitations based on chronic criteria and human health standards for non-carcinogens, and average conditions are used for establishing effluent limitations based on human health standards for carcinogens.

The 2014 permit included a minimum initial dilution of 185:1 (seawater: effluent) for effluent limitations based on the CCH's 1985 dilution study.

On March 16, 2017, the CCH submitted an updated dilution study for the facility using NRFIELD, the latest version of the Visual Plumes model for dilution calculations (2017 Dilution Study). The model evaluated the minimum dilution and average dilution in the initial mixing zone where jet and buoyant near field processes occur, as well as the far field dilution (with and without bacterial decay processes) using the most appropriate available data.

For initial mixing, the model considered more recent ambient and effluent data and model input values that accurately reflect current operating and environmental conditions, including:

- Ocean current measurements recorded from five (5) current meters deployed from September 30, 1989 through October 30, 1989;
- Quarterly ambient conductivity, temperature, depth profiler (CTD) data from 2012 through 2016;
- Effluent temperature and salinity data; and
- Peak 3-hour flow rate data from January 2016 through March 2016 as well as the average growth rate for each year to establish the projected 3-hour peak flow of 15.7 MGD.

The 2017 Dilution Study appears to represent ambient conditions accurately. For development of this draft permit, a minimum initial dilution of 445:1 was used for chronic aquatic toxicity and fish consumption criteria for non-carcinogens and an average initial dilution of 733:1 was used for fish consumption criteria for carcinogens. Additionally, an average dilution at the ZOM of 742:1 was used for analysis of nutrients.

NRFIELD was run using profiles from six (6) monitoring stations nearest to the diffuser, collected quarterly from 2012 to 2016, a total of 120 profiles. Model runs were performed using five (5) different currents. The facility projected 3-hour peak flow was used to model the minimum initial dilution and design flow was used to model the average initial dilution. The 10th percentile dilution factor from each current run for minimum initial dilution and geometric mean from each current run for average initial dilution were selected. The frequency of the currents was used to calculate a weighted average of each of the dilution factors.

HAR, 11-54-9, allows the use of a ZOM to demonstrate compliance with WQS. ZOMs consider initial dilution, dispersion, and reactions from substances which may be considered to be pollutants. For HAR, 11-54-6 parameters, reasonable potential to contribute to an exceedance of WQS is most reasonably assessed by comparing monitoring data at the edge of the ZOM to the applicable WQS. If an annual geometric mean at the edge of a ZOM exceeds the applicable WQS, the Permittee is determined to have reasonable potential for the pollutant. If an exceedance of WQS is not observed at the edge of the ZOM, it is assumed that sufficient dilution and assimilative capacity exists to meet WQS at the edge of the ZOM.

Assimilative capacity for pollutants with reasonable potential is evaluated for HAR, 11-54-6 pollutants by aggregating all ZOM control station data annually and comparing the annual geometric means to the applicable WQS. If an annual geometric mean exceeds 90 percent of the WQS, assimilative capacity is determined to be insufficient and dilution may not be granted. In order to determine whether granting dilution was appropriate, assimilative capacity was analyzed for the total nitrogen, ammonia nitrogen, and total phosphorus based on background data collected at control stations M1 and M6. Based on the calculations, there is assimilative capacity for all parameters analyzed.

(4) Summary of RPA Results. The maximum effluent concentrations from the DMRs over the current permit term, maximum projected receiving water concentration after dilution calculated using methods from the TSD, the applicable HAR, 11-54-4(c)(3) and 11-54-6(b)(3) water quality standard, and result of the RPA for pollutants discharged from Outfall Serial No. 001 are presented in Table F-6, below. Only pollutants detected in the discharge are presented in Table F-6. All other pollutants were not detected and therefore, no reasonable potential exists.

Table F-6. Summary of RPA Results

Parameter	Units	Number of Samples	Dilution	Maximum Effluent Concentration	Maximum Projected Concentration	Applicable Water Quality Standard	RPA Results
Arsenic, Total	µg/L	5	445:1	0.745	0.007	36	No

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Parameter	Units	Number of Samples	Dilution	Maximum Effluent Concentration	Maximum Projected Concentration	Applicable Water Quality Standard	RPA Results
Recoverable							
Chromium, Total Recoverable	µg/L	5	445:1	0.939	0.0089	50 ¹	No
Copper, Total Recoverable	µg/L	5	445:1	8.61	0.0813	3.5	No
Lead, Total Recoverable	µg/L	5	445:1	0.294	0.0028	5.9	No
Nickel, Total Recoverable	µg/L	5	445:1	2.59	0.0244	8.4	No
Selenium, Total Recoverable	µg/L	5	445:1	0.483	0.0046	71	No
Zinc, Total Recoverable	µg/L	5	445:1	75.1	0.7088	91	No
Chlordane	µg/L	57	733:1	0.1	0.000017	0.00016	No
Total Nitrogen	µg/L	20	NA	101.3 ²	101.3	110	No
Ammonia Nitrogen	µg/L	20	NA	2.13 ²	2.13	2.0	No ³
Total Phosphorus	µg/L	20	NA	7.72 ²	7.72	16	No

¹ Water quality standard is expressed as Chromium VI.

² Maximum annual geometric mean at the edge of the ZOM.

³ See discussion below.

(5) Reasonable Potential Determination.

(a) Constituents with limited data. In some cases, reasonable potential cannot be determined because effluent data are limited. The draft permit requires the Permittee to continue to monitor for these constituents in the effluent using analytical methods that provide the lowest available detection limitations. When additional data become available, further RPAs will be conducted to determine whether to add numeric effluent limitations to this draft permit or to continue monitoring.

(b) Pollutants with No Reasonable Potential. WQBELs are not included in this draft permit for constituents listed in HAR, 11-54-4(c)(3) and 11-54-6(b)(3) that do not demonstrate reasonable potential; however, monitoring for such pollutants is still required in order to collect data for future RPAs. Pollutants with no reasonable potential consist of those identified as such in Table F-5 or any pollutant not discussed in Parts D.2.c(5)(a) or D.2.c(5)(c) of this fact sheet.

The 2014 Permit included effluent limitations for the pollutants chlordane, ammonia nitrogen, and nitrate plus nitrite nitrogen. The Permittee contested the effluent limitations for these pollutants and the effluent limitations were subsequently stayed by the Hearings Officer

and are no longer applicable to the discharge. Since the effluent limitations were stayed, anti-backsliding regulations are satisfied.

A discussion further explaining the no reasonable potential determination for ammonia nitrogen is presented below.

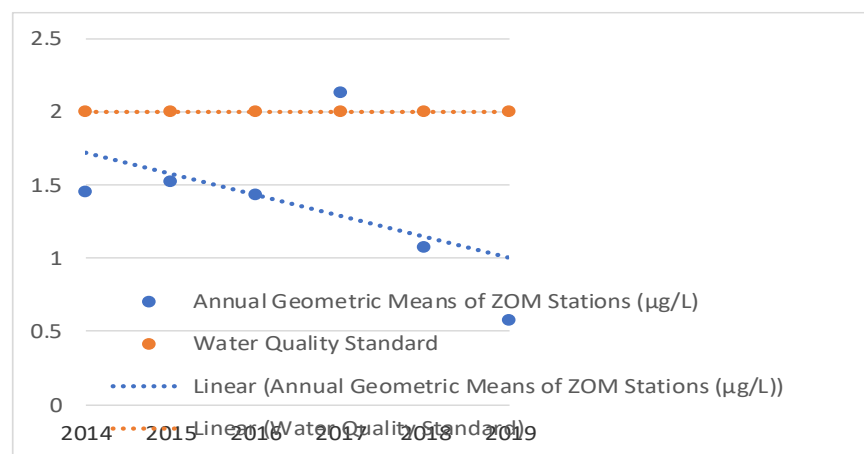
(1) Ammonia Nitrogen

HAR, Chapter 11-54-6 establishes following WQS for ammonia nitrogen:

Parameter	Geometric Mean	Value not to exceed more than 10% of the time	Value not to exceed more than 2% of the time
Ammonia Nitrogen ($\mu\text{g/L}$)	2.00	5.00	9.00

Although the annual geometric mean for ammonia nitrogen exceeded the WQS in 2017, it can be attributed to deficiencies in operation and maintenance of the existing treatment units at KRWWTTP, which shares the outfall with the facility. KRWWTTP has since undergone several corrective actions to address the deficiencies that seems to have improved the ammonia nitrogen ZOM results in subsequent years as shown in the table below.

Year	Annual Geometric Means of ZOM Stations ($\mu\text{g/L}$)
2014	1.45
2015	1.52
2016	1.43
2017	2.13
2018	1.07
2019	0.57



In addition, the geometric means for years prior to 2017 were significantly lower than the WQS. The data from 2014 to the present shows a decreasing trend of ammonia concentrations. Based on this decreasing trend and the KRWWTTP improvements to correct the plant deficiencies found in 2017, it was determined that there is no reasonable potential for the facility to cause or contribute to an exceedance of ammonia nitrogen in the receiving waters.

(c) Pollutants with Reasonable Potential. The RPA indicated that no parameter examined has reasonable potential to cause or contribute to an excursion above state water quality standards. However, due to the potential human health concerns from pathogens, effluent limitations for enterococcus have been established. Thus, WQBELs have been established in this draft permit at Outfall Serial No. 001 for enterococcus.

The WQBELs were calculated based on water quality standards contained in HAR, Chapter 11-54 and procedures contained in both the STCP and HAR, Chapter 11-54, as discussed in Part D.2.d, below.

d. WQBEL Calculations

Specific pollutant limits may be calculated for both the protection of aquatic life and human health.

(1) WQBELs based on Aquatic Life Standards. The STCP categorizes a discharge from a facility into one of four categories: (1) marine discharges through submerged outfalls; (2) discharges without submerged outfalls; (3) discharges to streams; or (4) high-rate discharges. Once a discharge has been categorized, effluent limitations for pollutants with reasonable potential can be calculated, as described below.

- (a)** For marine discharges through submerged outfalls, the daily maximum effluent limitation shall be the product of the chronic water quality standard and the minimum dilution factor;
- (b)** For discharges without submerged outfalls, the daily maximum effluent limitation shall be the acute toxicity standard. More stringent limits based on the chronic standards may be developed using Best Professional Judgment (BPJ);
- (c)** For discharges to streams, the effluent limitation shall be the most stringent of the acute standard and the product of the chronic standard and dilution; and
- (d)** For high rate outfalls, the maximum limit for a particular pollutant is equal to the product of the acute standard and the acute dilution factor

determined according to Section II.B.4 of the STCP. More stringent limits based on chronic standards may be developed using BPJ.

(2) WQBELs based on Human Health Standards. The STCP specifies that the fish consumption standards are based upon the bioaccumulation of toxics in aquatic organisms followed by consumption by humans. Limits based on the fish consumption standards should be applied as 30-day averages for non-carcinogens and annual averages for carcinogens.

(3) Calculation of Pollutant-Specific WQBELs

The discharge from this facility is considered a marine discharge through a submerged outfall. Therefore, for pollutants with reasonable potential, the draft permit establishes, on a pollutant by pollutant basis, daily maximum effluent limitations based on saltwater chronic aquatic life standard after considering dilution and average monthly effluent limitations for non-carcinogens or annual average effluent limitations for carcinogens based on the human health standard after considering dilution. WQBELs established in the draft permit are discussed in detail below.

As discussed in Part D.2.c.(3) of this fact sheet, the following dilution factors were granted:

Dilution Type	Dilution Value
Minimum Initial	445:1
Average Initial	733:1
ZOM Average	742:1

(a) Enterococcus

The discharge consists of treated sewage which may contain pathogens at elevated concentrations, if not properly disinfected, sufficient to impact human health or the beneficial use of the receiving water. Due to determination of reasonable potential for the discharge to exceed the WQS, and to ensure the protection of human health, this permit establishes effluent limitations for enterococcus.

On November 15, 2014, the State amended HAR, 11-54-8(b) to adopt new recreational water quality standards. The amended standards were approved by EPA on May 20, 2015. As amended, HAR, 11-54-8(b) establishes recreational criteria for all State waters designed to protect the public from exposure to harmful levels of pathogens while participating in water-contact activities. The specified recreational criteria for all State waters are: a geometric mean of 35 CFU/100 mL over any 30-day interval and a Statistical Threshold Value (STV) of 130 CFU/100 mL, which may not be exceeded in more

than ten percent of samples taken within the same 30-day interval in which the geometric mean is calculated.

Illness from exposure to pathogens may occur at concentrations within the mixing zone, thus for the protection of human health due to the potential for acute illness from pathogens, the minimum initial dilution of 445:1 was used to calculate applicable single sample maximum WQBELs for enterococcus, and the average initial dilution of 733 was used to calculate the applicable monthly geometric mean WQBELs.

Limitation. The draft permit establishes a final monthly geometric mean effluent limitation of 25,655 CFU/100 mL based on the enterococcus geometric mean of 35 CFU/100 mL and the average initial dilution at the ZID of 733:1. It also establishes a final single sample maximum effluent limitation, which may not be exceeded in more than ten percent of samples taken within the same 30-day interval in which the geometric mean was calculated, of 57,850 CFU/100 mL based on the STV of 130 mL and a minimum initial dilution at the ZID of 445:1.

Feasibility. An examination of effluent data from March 2014 through December 2018 shows that there would have been 12 exceedances each of the single sample maximum and the monthly geometric mean. However, with the exception of one single sample exceedance in 2017, all exceedances occurred prior to June 2016. Therefore, it appears that the facility is able to meet this limitation.

Anti-backsliding. Although effluent limitations were established in the 2014 permit for enterococcus, the limits were stayed and never went into effect. In addition, the previous permit issued in 2007 did not contain enterococcus effluent limitations. Therefore, anti-backsliding regulations are satisfied because the proposed effluent limitations are at least as stringent as the previous permits.

e. pH

Limitation. The Permittee was previously granted a ZOM for pH to comply with WQS for open coastal waters at HAR, 11-54-6(b)(3). The 2014 permit set the pH effluent limitation as between 6.0 and 9.0 standard units, which is consistent with the technology-based effluent limitation for treatment plants. Receiving water data from January 2014 to December 2018 indicate compliance with the pH WQS at the edge of the ZOM. The technology-based effluent limitations of between 6.0 to 9.0 standard units appear to be protective of water quality outside of the ZOM and have been retained from the 2014 permit.

Feasibility. Based on effluent monitoring data from January 2014 to

December 2018, the discharge should continue to comply with the effluent limitation.

Anti-backsliding. Anti-backsliding regulations are satisfied because the proposed effluent limitations are at least as stringent as the 2014 permit.

f. Whole Effluent Toxicity (WET)

WET limitations protect receiving water quality from the aggregated toxic effect of a mixture of pollutants in an effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent or receiving water. The WET approach allows for protection of the narrative criterion specified in HAR, 11-54-4(c)(2), while implementing Hawaii's numeric WQS for toxicity. There are two (2) types of WET tests – acute and chronic. An acute toxicity test is conducted over a short period of time and measures mortality. A chronic toxicity test is generally conducted over a longer period of time and may measure mortality, reproduction, or growth.

The 2014 permit established a chronic WET effluent limitation at Outfall Serial No. 001 for *Tripneustes gratilla* ("*T. gratilla*").

In order to improve WET analysis, DOH implemented EPA's Test of Significant Toxicity Approach (TST) for WET effluent limitations within the State in the 2014 permit. As such, the chronic WET effluent limitation at Outfall Serial No. 001 has been retained to be consistent with the TST approach using *T. gratilla*, a native species to Hawaii. WET data for the time period between March 2014 and July 2017 using the test species *T. gratilla* resulted in four exceedances of the chronic toxicity effluent limitation.

Test procedures for measuring toxicity to marine organisms of the Pacific Ocean, including *T. gratilla*, are not provided at 40 CFR 136. Consistent with the Preamble to EPA's 2002 Final WET Rule, test procedures that are not approved at 40 CFR 136 may be included in a permit on a permit-by-permit basis (under 40 CFR 122.41(j)(4) and 122.44(i)(iv)). The use of alternative methods for West coast facilities in Hawaii is further supported under 40 CFR 122.21(j)(5)(viii), which states, "West coast facilities in..., Hawaii,... are exempted from 40 CFR [P]art 136 chronic methods and must use alternative guidance as directed by the permitting authority."

EPA has issued applicable guidance for conducting chronic toxicity tests using *T. gratilla* in *Hawaiian Collector Urchin, Tripneustes gratilla (Hawa'e) Fertilization Test Method* (Adapted by Amy Wagner, EPA Region 9 Laboratory, Richmond, CA from a method developed by George Morrison, EPA, ORD Narragansett, RI and Diane Nacci, Science Applications International Corporation, ORD Narragansett, RI) (EPA/600/R-12/022).

As previously discussed, reasonable potential for WET has been determined for Outfall Serial No. 001 and an effluent limitation must be established in accordance with 40 CFR 122.44(d)(1). Further, a WET effluent limitation and monitoring are necessary to ensure compliance with applicable WQS in HAR, 11-54-4(b)(2).

The proposed WET limitation and monitoring requirements for a discharge which is submerged are incorporated into the draft permit in accordance with the EPA National Policy on Water Quality-Based Permit Limits for Toxic Pollutants issued on March 9, 1984 (49 FR 9016), HAR, 11-54-4(b)(2)(B), and EPA's *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003, 2010).

Consistent with HAR, 11-54-4(b)(2)(B), the draft permit retains the chronic toxicity effluent limitation based on the TST hypothesis testing approach. The TST approach was designed to statistically compare a test species response to the in-stream waste concentration (IWC) and a control.

For continuous discharges through submerged outfalls, HAR, 11-54-4(b)(4)(A) requires the no observed effect concentration (NOEC), expressed as a percent of effluent concentration, to not be less than 100 divided by the minimum dilution.

The 2017 dilution study minimum dilution of 445:1, used to determine an applicable IWC, is greater than the previous initial minimum dilution used to calculate the IWC, which was 185:1 (in 1985). The use of 445:1 dilution is based on the availability of new information contained within the Permittee's updated dilution study and is consistent with Section 402(o)(2) of the CWA's backsliding requirements. Further, the Permittee's historic effluent data indicates frequent occurrences of elevated levels of toxicity (with *T. gratilla*, justifying the need for greater dilution. Because the Permittee has historically exceeded WET standards using *T. gratilla*, an effluent limitation based on an IWC of 445:1 would not result in any additional pollutant loading of toxic substances greater than is currently being discharged.

The following equation is used to calculate the IWC where dilution is granted (Outfall Serial No. 001):

$$\begin{aligned}\text{IWC} &= 100/\text{critical dilution factor} \\ &= 100/445 \\ &= 0.22\%\end{aligned}$$

For any one chronic toxicity test, the chronic WET permit limit that must be met is rejection of the null hypothesis (H_0):

IWC (percent effluent) mean response $\leq 0.75 \times$ Control mean response

A test result that rejects this null hypothesis is reported as “Pass”. A test result that does not reject this null hypothesis is reported as “Fail”.

The acute and chronic biological effect levels (effect levels of 20% and 25%, respectively, or b values of 0.80 and 0.75, respectively) incorporated into the TST define EPA’s unacceptable risks to aquatic organisms and substantially decrease the uncertainties associated with the results obtained from EPA’s traditionally used statistical endpoints for WET. Furthermore, the TST reduces the need for multiple test concentrations which, in turn, reduces laboratory costs for dischargers while improving data interpretation. A significant improvement offered by the TST approach over traditional hypothesis testing is the inclusion of an acceptable false negative rate. While calculating a range of percent minimum significant differences (PMSDs) provides an indirect measure of power for the traditional hypothesis testing approach, setting appropriate levels for β and α using the TST approach establishes explicit test power and provides motivation to decrease within test variability which significantly reduces the risk of under reporting toxic events (U.S. EPA 2010¹). Taken together, these refinements simplify toxicity analyses, provide dischargers with the positive incentive to generate high quality data, and afford effective protection to aquatic life.

A WET effluent limitation based on the TST hypothesis testing approach is protective of the WQS for toxicity contained in HAR, 11-54-4(b)(4)(B) and is not considered to be less stringent. Use of the TST approach is consistent with the requirements of State and federal anti-backsliding regulations.

Effluent dilution water and control water shall be receiving water or lab water, as described in the test methods manual *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995). If the dilution water is different from test organism culture water, then a second control using culture water shall also be used.

g. Storm Water – Outfall Serial No. 002

Storm water discharges from the facility are subject to the NPDES requirements under 40 CFR Part 122.26(b)(14)(ii) for discharges of storm water associated with industrial activity. The 2014 permit identified Outfall Serial No. 002 as a storm water outfall and included effluent limitations and monitoring requirements. However, storm water discharges from the facility have also been covered under the Permittee's Municipal Separate Storm

¹ U.S. Environmental Protection Agency. 2010. *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document*. EPA 833-R-10-003. Washington, DC: Office of Wastewater Management.

Sewer System (MS4) – NPDES Permit No. HI S000007. Therefore henceforth, storm water discharges from the facility will continue to be covered under the Permittee's MS4 permit only. Accordingly, there are no storm water requirements in the draft permit.

h. Summary of Final Effluent Limitations

HAR, 11-55-20 requires that daily quantitative limitations by weight be established where possible. Thus, in addition to concentration-based effluent limitations, mass-based effluent limitations (in pounds per day) have been established where applicable based on the following formula:

$$\text{lbs/day} = 8.34 * \text{concentration (mg/L)} * \text{flow (MGD)}$$

40 CFR 122.45(b)(1) requires that mass-based effluent limitations for POTWs be based on design flow. The 2014 permit established mass based effluent limitations on a design flow of 2.0 MGD. This draft permit continues to include mass-based effluent limitations using a flow of 2.0 MGD.

(1) Outfall Serial No. 001

The following table lists final effluent limitations at Outfall Serial No. 001 contained in the draft permit and compares them to effluent limitations contained in the 2014 permit. Mass limitations are based on the facility's design flow (2.0 MGD).

Table F-7. Summary of Final Effluent Limitations – BOD₅ and TSS

Parameter	Units	Effluent Limitations Contained in the 2014 Permit		Proposed Effluent Limitations	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	mg/L	30	45	30	45
	lbs/day	500	751	500	751
	% Removal	As a monthly average, not less than 85 percent removal efficiency from the influent stream.		The average monthly percent removal shall not be less than 85 percent.	
Total Suspended Solids (TSS)	mg/L	30	45	30	45
	lbs/day	500	751	500	751
	% Removal	As a monthly average, not less than 85 percent removal efficiency from the influent stream.		The average monthly percent removal shall not be less than 85 percent.	

Table F-8. Summary of Final Effluent Limitations – All Other Pollutants

Parameter	Units	Effluent Limitations Contained in the 2014 Permit			Proposed Effluent Limitations		
		Average Annual	Monthly Geometric Mean	Maximum Daily	Average Annual	Monthly Geometric Mean	Maximum Daily
pH	s.u.	Not less than 6.0 and not greater than 9.0			Not less than 6.0 and not greater than 9.0		
Chlordane	µg/L	0.030 ¹	--	0.74 ¹	--	--	--
	lbs/day	0.00050 ¹	--	0.012 ¹	--	--	--
Enterococcus	CFU/100 ml	--	6,510 ¹	93,186 ^{1,2}	--	25,655	57,850 ²
Oil and Grease	mg/L	--	--	10	--	--	--
	lbs/day	--	--	167	--	--	--
Ammonia Nitrogen	µg/L	--	--	26,810 ¹	--	--	--
	lbs/day	--	--	447 ¹	--	--	--
Nitrate + Nitrite Nitrogen	µg/L	--	--	6,400 ⁴	--	--	--
	lbs/day	--	--	107 ⁴	--	--	--
Chronic Toxicity – <i>Tripneustes Gratilla</i>	--	--	--	Pass ⁶	--	--	Pass ⁶

¹ Limitation was stayed and did not become effective.

² Effluent limitation expressed as a single sample maximum.

⁴ "Pass," as described in Part D.2.k of this Fact Sheet.

(2) Outfall Serial No. 002

As explained above, storm water discharges were covered under both the 2014 and the Permittee's MS4 permits but hereafter, it will continue to be covered under the Permittee's MS4 only. Therefore, there are no storm water requirements in the draft permit.

i. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the 2014 permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA Sections 402(o) or 303(d)(4), or, where applicable, 40 CFR 122.44(l).

Federal anti-backsliding regulations at 40 CFR 122.44(l)(i) allows for effluent limitations in a reissued permit to be less stringent if information is available which was not available at the time of the permit issuance and which have justified the application of a less stringent effluent limitation.

Effluent limitations and requirements for all pollutants contained in this draft permit are retained from those contained in the current permit except for ammonia nitrogen, chlordane, ammonia nitrogen, oil and grease, and nitrate + nitrite nitrogen. Based on information from the previous permit term for chlordane and ammonia nitrogen, it was determined that there is no

reasonable potential for those parameters to cause or contribute to an exceedance of their respective WQS. For oil and grease, although there was one oil and grease exceedance of the permit limit, as noted in the 2019 inspection report, oil and grease was detected in the effluent only three times between June 2014 and December 2018. In addition, there are no water quality standards for oil and grease and therefore reasonable potential cannot be determined. DOH's new implementation procedures eliminate monitoring for nitrate + nitrite nitrogen because the various forms of nitrogen change in the receiving water. Therefore, total nitrogen is considered to be the most appropriate characterization of water quality. Receiving water monitoring requirements for total nitrogen, ammonia nitrogen, and total phosphorus remain to perform future reasonable potential analyses.

Requirements for storm water associated with industrial activity, although removed from the draft permit, will continue to be regulated under the Permittee's MS4 permit. The storm water limitations and monitoring requirements in the 2014 permit and the current MS4 permit are the same, and therefore consistent with anti-backsliding regulations.

j. Satisfaction of Antidegradation Policy Requirements

The DOH established the State antidegradation policy in HAR, 11-54-1.1, which incorporates the federal antidegradation policy at 40 CFR 131.12. HAR, 11-54-1.1 requires that the existing quality of waters be maintained unless degradation is justified based on specific findings demonstrating that allowing lower water quality is necessary to accommodate economic or social development in the area in which the waters are located. All effluent limitations and requirements of the draft permit are retained from the 2014 permit, unless otherwise noted above. Therefore, the permitted discharge is consistent with antidegradation provisions of 40 CFR 131.12 and HAR, 11-54-1.1. The impact on existing water quality will be insignificant and the level of water quality necessary to protect the existing uses will be maintained and protected.

E. Rationale for Receiving Water and Zone of Mixing Requirements

1. Summary of ZOM Water Quality Standards and Monitoring Data

The following are receiving water monitoring results for HAR, Chapter 11-54, specific water quality criteria parameters that were provided with the KRWWTWP ZOM Application, and applicable ZOM water quality criteria from HAR, 11-54-6(b)(3).

Table F-9. ZOM Monitoring Data

Parameter	Units	Applicable Water Quality Standard	Maximum Annual Geometric Mean

Parameter	Units	Applicable Water Quality Standard	Maximum Annual Geometric Mean
Total Nitrogen	µg/L	110 ¹	188
Ammonia Nitrogen	µg/L	2.0 ¹	12
Nitrate+Nitrite Nitrogen	µg/L	3.5 ¹	13
Total Phosphorus	µg/L	16 ¹	11
Chlorophyll <i>a</i>	µg/L	0.15 ¹	NR
Turbidity	NTU	0.20 ¹	0.81
pH	s.u.	7.6 – 8.6 ²	8.1 – 8.4
Dissolved Oxygen	mg/L	³	0.83
Temperature	°C	⁴	28
Salinity	ppm	⁵	35

¹ Water quality standard expressed as a geometric mean.

² pH shall not deviate more than 0.5 units from a value of 8.1

³ Dissolved oxygen shall not be less than 75 percent saturation.

⁴ Temperature shall not vary more than 1° Celsius from ambient conditions.

⁵ Salinity shall not vary more than 10 percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

2. Existing Receiving Water Limitations and Monitoring Data

a. Shoreline Stations

The following are a summary of the geometric mean values reported for each shoreline monitoring location by the KRWWTW from March 2014 through May 2018.

Table F-10. Shoreline Monitoring Stations

Station	Enterococcus ¹ (CFU/100 mL)
MS1	20
MS2	234
MS4	42
Kailua Beach	24
Kalama Beach	18
North Beach	14
Oneawa Beach	61
Applicable Water Quality Standard	35

¹ Reported geometric means are the maximum annual geometric mean reported at each monitoring station.

b. Offshore Stations

The following are a summary of the geometric mean values calculated from each offshore monitoring location on the edge of the ZOM, or reference station, reported in quarterly DMRs for KRWWTW from 2014 through 2018. The geometric means are the maximum annual geometric mean from the top, middle, and bottom sampling points at each station.

Table F-11. Offshore Monitoring Stations

Station	Highest Observed Geometric Mean						
	Enterococcus	Nitrate + Nitrite Nitrogen	Ammonia Nitrogen	Total Nitrogen	Total Phosphorus	Turbidity	Chlorophyll <i>a</i>
	CFU/100 mL	µg/L	µg/L	µg/L	µg/L	NTU	µg/L
M1 ¹	0.63	1.5	2.4	99	7.4	0.28	0.18
M2	0.74	2.3	2.9	109	7.6	0.28	0.21
M3	0.69	1.4	3.5	104	7.3	0.23	0.19
M4	1.0	3.3	3.8	103	8.3	0.23	0.18
M5	0.57	2.1	3.6	101	7.8	0.25	0.26
M6 ¹)	0.81	1.4	3.3	101	7.9	0.26	0.19
Applicable Water Quality Standard	35	3.5	2.0	110	16	0.20	0.15

¹ Control Station

3. Proposed Receiving Water Limitations

- a. The draft permit incorporates receiving water monitoring for future RPA and receiving water assessment. The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by DOH, as required by the Water Quality Act of 1987 (P.L. 100-4) and regulations adopted thereunder. The DOH adopted water quality standards specific for open coastal waters in HAR, Chapter 11-54.
- b. The discharge from the facility shall not interfere with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife and allows recreational activities in and on the water. The draft permit incorporates receiving water monitoring for the protection of the beneficial uses of the Pacific Ocean.
- c. The Permittee is required to comply with the HAR, Chapter 11-54, Basic Water Quality Criteria of which has been incorporated as part of the draft permit under Section 1 of the DOH Standard NPDES Permit Conditions (Version 15).

4. Zone of Mixing (ZOM)

HAR, Chapter 11-54 allows for a ZOM, which is a limited area around outfalls to allow for initial dilution of waste discharges, if the ZOM is in compliance with requirements in HAR, 11-54-9(c). The Permittee has requested that the existing ZOM, also issued to the KRWWTP, for the assimilation of treated wastewater be retained. Consistent with the current permit, the ZOM requested is 1,000 feet wide and 1,960 feet along the centerline of the diffuser, and extends vertically downward to the ocean floor.

- a. Prior to the renewal of a ZOM, the environmental impacts, protected uses of the receiving water, existing natural conditions, character of the effluent, and adequacy of the design of the outfall must be considered. The following findings were considered:
- (1) The Permittee's ZOM application indicates that the existing physical environment is a marine bottom, class II reef flats. The ZOM application indicates that no major physical effects are expected due to the continuation of the ZOM.
 - (2) The diffuser for Outfall Serial No. 001 reportedly provides a minimum of 445:1 dilution and discharges approximately 3,323 feet offshore. No information provided in the ZOM application indicates that dilution would be negatively impacted by current conditions.
 - (3) The Permittee's ZOM application indicates that, based on monitoring data on the existing chemical environment, there seems to be no difference in water quality between the ZOM stations and control stations. Therefore, there appears to be no major environmental effects on the receiving water from the discharge.
 - (4) Effluent data and receiving water data are provided in Tables F-7, F-8, F-9, F-10, and F-11 of this Fact Sheet. The effluent and receiving water data indicate there is a potential for ammonia nitrogen impairment as discussed in Part D.2.d of this Fact Sheet. However, biological monitoring of the facility's diffuser found that no evidence of negative impacts to fish populations due to the diffuser was identified.
- b. HAR 11-54-9(c)(5) prohibits the establishment of a ZOM unless the application and supporting information clearly show: that the continuation of the ZOM is in the public interest; the discharge does not substantially endanger human health or safety; compliance with the WQS would produce serious hardships without equal or greater benefits to the public; and the discharge does not violate the basic standards applicable to all waters, will not unreasonably interfere with actual or probable use of water areas for which it is classified, and has received the best degree of treatment or control. The following findings were made in consideration of HAR, 11-54-9(c)(5):
- (1) The facility treats domestic wastewater for approximately 16,000 people on the Marine Corps Base Hawaii, Kaneohe Bay and is a necessity for public health. There are no other treatment facilities currently servicing this area and a cessation of function or operation would cause severe hardship to the residents.
 - (2) The level of treatment of the discharge and the depth and distance of the outfall offshore does not substantially endanger human health or safety. A

review of the shoreline, nearshore, and offshore enterococcus bacteria data does not indicate a shoreward movement of the ocean outfall discharge.

- (3) The feasibility and costs to install treatment necessary to meet applicable WQS end-of-pipe, or additional supporting information, were not provided by the Permittee to demonstrate potential hardships. As discussed in Part E.4.b, the operation of the facility has been found to benefit the public. No information is known that would revise the finding during the 2014 permit term that compliance with the applicable WQS without a ZOM would produce serious hardships without equal or greater benefits to the public.
- (4) As discussed in Part D.2.c(5)(c) of this fact sheet, effluent data indicates the presence of pollutants in excess of applicable WQS. However, this permit establishes water quality-based effluent limitations based on WQS. The draft permit requires compliance with the effluent limitations and conditions which are protective of the actual and probable uses of the receiving water and implement applicable technology-based effluent limitations.

The DOH has determined that the ZOM satisfies the requirements in HAR, 11-54-09(c)(5). Based on the finding that the ZOM satisfies the applicable requirements, pollutants for which a ZOM has been previously approved will retain the ZOM. These pollutants include total nitrogen, ammonia nitrogen, nitrate plus nitrite nitrogen, total phosphorus, chlorophyll a, pH, temperature, and salinity, light extinction coefficient, turbidity, and dissolved oxygen.

The establishment of the ZOM is subject to the conditions specified in Part D of the draft permit. The draft permit incorporates receiving water monitoring requirements which the DOH has determined are necessary to evaluate compliance of the Outfall Serial No. 001 discharges with the applicable water quality criteria, as described further in Part F.4 of this fact sheet.

F. Rationale for Monitoring and Reporting Requirements

40 CFR 122.41(j) specify monitoring requirements applicable to all NPDES permits. HAR, 11-55-28 establishes monitoring requirements applicable to NPDES permits within the State of Hawaii. 40 CFR 122.48 and HAR, 11-55-28 require that all NPDES permits specify requirements for recording and reporting monitoring results. The principal purposes of a monitoring program are to:

- Document compliance with waste discharge requirements and prohibitions established by the DOH;
- Facilitate self-policing by the Permittee in the prevention and abatement of pollution arising from waste discharge;

- Develop or assist in the development of limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards; and
- Prepare water and wastewater quality inventories.

The draft permit establishes monitoring and reporting requirements to implement federal and State requirements. The following provides the rationale for the monitoring and reporting requirements contained in the draft permit.

1. Influent Monitoring

Influent monitoring is required to determine the effectiveness of pretreatment and non-industrial source control programs, to assess the performance of treatment facilities, and to evaluate compliance with effluent limitations. Influent monitoring requirements for flow, BOD₅, and TSS have been retained from the 2014 permit. The proposed influent water monitoring requirements are specified in Part A.1 of the draft permit.

2. Effluent Monitoring

a. Outfall Serial No. 001

The following monitoring requirements are applicable at Outfall Serial No. 001.

- (1) Monitoring requirements for ammonia nitrogen are retained from the 2014 permit due to results of the RPA and to enable comparison with the receiving water ZOM monitoring results to determine if the facility effluent is contributing to elevated concentrations of said pollutant.
- (2) Monitoring requirements for total nitrogen, phosphorus, and turbidity have been removed due to results of the RPA that found no reasonable potential to exceed the WQS. Monitoring requirements for nitrate + nitrite nitrogen have been removed from the draft permit. Nitrate + nitrite nitrogen is constituent of the total nitrogen series. Since various forms of nitrogen change in the receiving water, total nitrogen is the most appropriate characterization of water quality. Therefore, nitrate + nitrite nitrogen monitoring is no longer necessary.
- (3) Monitoring requirements for flow have been retained from the 2014 permit to calculate pollutant loading and to determine compliance with mass-based effluent limitations.
- (4) Monitoring requirements for temperature have been removed due to results of the RPA and data over the 2014 permit term showing no reasonable potential to exceed to WQS.

- (5) Monitoring requirements for pH, BOD₅, TSS, and enterococcus have been retained from the 2014 permit in order to determine compliance with effluent limitations and to collect data for future RPAs.
- (6) Monitoring requirements for total oil and grease have been removed since it has no water quality standard.
- (7) Monitoring requirements for chlordane have been removed due to results of the RPA and data over the 2014 permit term showing no reasonable potential to exceed to WQS (Note: The chlordane effluent limitation was stayed did not go into effect).
- (8) Monitoring requirements for all other pollutants listed in Appendix 1 of the draft permit are retained from the 2014 permit in order to collect data for future RPAs.

b. Storm Water Monitoring – Outfall Serial No. 002

Storm water monitoring requirements were removed from the draft permit. Storm water discharges from the facility is already being regulated in the Permittee's MS4 permit.

3. Whole Effluent Toxicity Monitoring

Consistent with the 2014 permit, monthly whole effluent toxicity testing is required in order to determine compliance with whole effluent toxicity effluent limitations as specified in Parts A.1 and B of the draft permit.

4. Receiving Water Quality Monitoring Requirements

a. Shoreline Water Quality Monitoring

Shoreline water quality monitoring for enterococci is used to determine compliance with water quality criteria specific for marine recreational waters, as described in Part C of the draft permit. The Permittee shall monitor at five stations with a frequency of five days per month in order to calculate a geometric mean. These monitoring requirements are retained from the 2014 permit and included in Part E of the draft permit.

b. Offshore Water Quality Monitoring

Offshore water quality monitoring is required to assess the receiving waters surrounding the facility's outfall. The draft permit requires the Permittee to monitor offshore waters at four stations along the ZOM and two control stations outside the ZOM boundary. All monitoring requirements for offshore stations are retained from the 2014 permit and included in Part E of the draft permit.

c. Ocean Outfall Monitoring

At least once during the term of this permit, the Permittee shall inspect the ocean outfall and submit the investigation findings to the DOH. The outfall inspection shall include, but not be limited to, an investigation of the structural integrity, operational status, and maintenance needs. The Permittee shall include findings of the inspection to the DOH in the annual wastewater pollution prevention report in Part F of the draft permit for the year the outfall inspection is conducted. This requirement is retained from the 2014 permit.

G. Rationale for Provisions

1. Standard Provisions

The Permittee is required to comply with DOH Standard NPDES Permit Conditions (Version 15) which is included as part of the draft permit.

2. Monitoring and Reporting Requirements

The Permittee shall comply with all monitoring and reporting requirements included in the draft permit and in the DOH Standard NPDES Permit Conditions.

3. Special Provisions

a. Reopener Provisions

The draft permit may be modified in accordance with the requirements set forth at 40 CFR 122 and 124, to include appropriate conditions or limitations based on newly available information, or to implement any new state water quality criteria that are approved by the EPA.

b. Special Studies and Additional Monitoring Requirements

(1) Toxicity Reduction Requirement. The draft permit requires the Permittee to submit an initial investigation Toxicity Reduction Evaluation (TRE) workplan to the DOH and EPA which shall describe steps which the Permittee intends to follow in the event that toxicity is detected. This requirement is retained from the 2014 permit and is discussed in detail in Part B.2 of the draft permit.

4. Special Provisions for Municipal Facilities

a. Industrial Pretreatment Requirements

The draft permit includes an industrial pretreatment program to minimize the potential for plant upsets due to industrial discharges. The industrial

pretreatment requirements are based on the requirements contained in the current permit.

b. Biosolids Requirements

The use and disposal of biosolids is regulated under federal laws and regulations, including permitting requirements and technical standards included in 40 CFR 503, 257, and 258. The biosolids requirements in the draft permit are in accordance with 40 CFR 257, 258, and 503, are based on the 2014 permit and are consistent with NPDES permits issued to other Hawaii POTWs.

5. Other Special Provisions

a. Wastewater Pollution Prevention Program

The draft permit requires the Permittee to submit a wastewater pollution control plan by May 31 each year. This provision is retained from the 2014 permit and is required to ensure that the Permittee is operating correctly and attaining maximum treatment of pollutants discharged by considering all aspects of the wastewater treatment system. This provision is included in Part F of the draft permit.

b. Personnel Certifications

Wastewater treatment facilities subject to the draft permit shall be supervised and operated by persons possessing certificates of appropriate grade, as determined by the DOH. If such personnel are not available to staff the wastewater treatment facilities, a program to promote such certification shall be developed and enacted by the Permittee. This provision is included in the draft permit to ensure that the facility is being operated correctly by personnel trained in proper operation and maintenance. This provision is retained from the 2014 permit and included in Part J of the draft permit.

c. Alternative Power Source

The Permittee shall maintain in good working order a sufficient alternate power source for operating the wastewater treatment and disposal facilities. This provision is retained from the 2014 permit in order to ensure that if a power failure occurs, the facility is well equipped to maintain treatment operations until power resumes. If an alternate power source is not in existence, the draft permit requires the Permittee to halt, reduce, or otherwise control all discharges upon the reduction, loss, or failure of the primary source of power. This provision is included in Part J of the draft permit.

d. Treatment Plant Maintenance and Process Sludge Monitoring

The draft permit requires the Permittee to utilize a Process Control Program and continue monthly and bimonthly grab sample monitoring of the solid waste stream as part of routine operation and maintenance. These provisions are retained from the 2014 permit to ensure that the facility is being properly operated and maintained.

e. Response to Spill Sewage

The draft permit requires the Permittee to properly clean up any spill and provide public warnings and limited public access to areas affected by the spill. This provision is retained from the 2014 permit to ensure that spills are properly cleaned up and do not endanger the public.

H. Public Participation

A public notice of proposed permit will be published in the ***Honolulu Star-Advertiser*** on **October 23, 2019**, soliciting public comment on the proposed action for a 30-day period. The permit application, applicable documents, proposed permit and rationale will be available for public review at the CWB office. Persons wishing to comment upon or object to the proposed draft NPDES permit in accordance with HAR, 11-55-09(b) and 11-55-09(d), will have the opportunity to submit their comments in writing either in person or by mail, to:

Clean Water Branch
Environmental Management Division
2827 Waimano Home Road, Room 225
Pearl City, Hawaii 96782